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SENATE

REPORT
98-412

NATIONAL SCIENCE FOUNDATION AUTHORIZATION ACT FOR FISCAL YEAR 1984

APRIL 26 (legislative day, APRIL 24), 1984.—Ordered to be printed

Mr. PACKWOOD, from the Committee on Commerce, Science, and Transportation, submitted the following

REPORT

[To accompany S. 2601]

The Committee on Commerce, Science, and Transportation, having considered an original bill (S. 2601) to authorize appropriations for the National Science Foundation for fiscal year 1985, and for other purposes, reports favorably thereon and recommends that the bill do pass.

PURPOSE OF BILL

The bill authorizes appropriations of $1,528,792,000 for the National Science Foundation (NSF) for fiscal year 1985.

BACKGROUND AND NEEDS

The NSF is an independent agency, established by the National Science Foundation Act of 1950 (Public Law 81-507). The NSF is unique among Federal agencies in that its primary statutory mandate is to support nonbiomedical basic research in all fields of science and engineering, through grants and contracts to colleges, universities and other research entities.

In fiscal year 1983, the NSF accounted for 16 percent of the total Federal support of basic research, and provided 24 percent of Federal funding to academic institutions. In some disciplines (for example, pure mathematics and anthropology), the NSF is responsible for over 90 percent of the support for basic research in the universities.

Similarly, the NSF provides approximately three-quarters of such support for the earth and ocean sciences, and about one-third

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in other fields, including chemistry and electrical engineering. Not only does this money support fundamental research, but it also provides support for graduate and post-doctoral students in the early stages of their careers.

The NSF is divided into seven directorates: (1) mathematics and physical sciences (MPS); (2) biological, behavorial and social sciences (BBS); (3) astronomical, atmospheric, earth and ocean sciences (AAEO); (4) engineering (ENG); (5) science and engineering education (SEE); (6) scientific, technological and international affairs (STIA); and (7) program development and management (PDM).

Of these seven, the first four are considered "research" directorates. The fifth, SEE, was reestablished in 1983, to provide oversight of, and continuity for, the Foundation's activities in science education, which account for about 3 percent of the NSF's total budget. The sixth, STIA, is responsible for joint coordination with the research directorates of programs that transcend the disciplines, such as programs for minority and women scientists, and international programs. The seventh, PDM, is concerned with internal NSF management. There are numerous programmatic areas within the research directorates. Each of these programs is reviewed every 3 years by an oversight panel of external reviewers.

The National Science Board (NSB), the board of directors for the NSF, establishes policy for the Foundation. The NSB, the Director, the Deputy, and four of the six Assistant Directors of the NSF are Presidential appointees.

Legislative History

On February 22 and 23, 1984, the Subcommittee on Science, Technology, and Space held hearings on the proposed NSF program and budget for fiscal year 1985. The subcommittee heard testimony which covered the Foundation's overall budget. The Committee focused particularly on initiatives in the engineering directorate, including the proposed Cross-Disciplinary Engineering Centers, and on initiatives in research instrumentation, including supercomputers. Witnesses included the Director of the Foundation, the Science Advisor to the President, the President of the National Academy of Engineering, representatives of the National Science Board, and representatives of the academic and industrial research communities, including the Association of American Universities.

On March 27, 1984, the Committee ordered to be reported favorably an original bill.

RESEARCH AND RELATED ACTIVITIES

Mathematical and physical sciences

The goal of the MPS activity is to develop a fundamental understanding of the physical laws that govern the universe in which we live, and to assure that the next generation of scientists will receive quality training. To further this goal, research activities are supported in mathematics, computer science, physics, chemistry, and materials science.

The fiscal year 1985 budget request for MPS is $416,710,000. This figure represents an increase of 16.1 percent over the fiscal year

1984 level of $358,823,000. Substantial increases are provided across the full range of disciplines and subfields. Special emphasis is given to the mathematical sciences in order to continue to redress past deficiencies in the support of graduate students and postdoctoral researchers. Research awards will be enlarged in each of the other disciplines, especially with respect to instrumentation and facilities, graduate students and postdoctorals, and technical and other infrastructure support. The number of awards will increase modestly to accommodate additional young faculty investigators. Other areas of special emphasis include: computational mathematics and statistics; continued planned growth in the Coordinated Experimental Research program in computer research; upgrading of the Cornell Electron Storage Ring to improve beam luminosity and detector sensitivity for elementary particle physics experiments; increased emphasis on research into the chemistry of life processes, in coordination with the biological sciences programs; and increased support for group research projects and facilities in materials research, particularly in the basic engineering aspect of materials.

Engineering

The ENG activity seeks to improve understanding of the fundamental questions involved in engineering research. In fiscal year 1985, the directorate will focus research attention on selected areas which are relevant to national problems, strengthening the infrastructure of the engineering research community, and linking engineering research to the training of students.

The fiscal year 1985 NSF budget request for Engineering is $147,100,000, representing an approximately 22 percent increase over the fiscal year 1984 level of $120,723,000. With the proposed increase, ENG will undertake initiatives to expand opportunities for engineers to use advanced scientific computers and support Centers for Cross-Disciplinary Research in Engineering. Special emphasis will also be given to: increased capital and human resources support within the academic engineering community, particularly by continuing support for research opportunities for the most promising young engineering faculty through the Presidential Young Investigator Awards program begun in fiscal year 1984; and to increased support for experimental research, especially in such critical areas as automated manufacturing, robotics, microstructures engineering, computer-aided design, and electrochemical engineering and catalysis.

Biological, behavioral, and social sciences

The goal of the BBS activity is to increase knowledge about life forms and life processes through research on biological and social phenomena. Projects supported range from studies of the fundamental molecules of living organisms to research into the complex relationships between human populations and their social and economic institutions and organizations.

The fiscal year 1985 budget request for BBS is $253,120,000. This represents an increase of 12.7 percent above the fiscal year 1984 level of $224,658,000. The requested increase will enable the BBS activity to augment support for the most promising projects, using

new techniques in molecular genetics and increasingly sophisticated instrumentation. Funding in the plant sciences will include continuation of programs for young investigators and enhancement of project support by providing the instrumentation, facilities, and technical resources necessary to achieve major increases in research productivity. The increases in the social and economic sciences will enable the improvement and expansion of major data bases and research using these resources. Cognitive science and anthropology will increase attention to such topics as human origins and development of cognitive capacities. Information science and technology will emphasize fundamental research to determine general information system design principles, and on the economics of information as a commodity and its impact on society. Continued attention will be given to improving support for advanced scientific computing and research and instrumentation at predominantly undergraduate institutions.

Astronomical, atmospheric, earth, and ocean sciences

The AAEO activity aims to increase understanding of the physical nature of the universe; advance knowledge of the behavior of the earth's atmosphere; provide further insight into the physical and chemical composition of the earth and its geologic history; improve knowledge of the composition of the world's oceans, their dynamic properties, and the living creatures they support; and advance knowledge of natural phenomena and processes in the Artic. In addition to offering research support to individual scientists in these fields, AAEO also supports major research facilities such as the National Center for Atmospheric Research and six National Astronomy Centers.

The fiscal year 1985 budget request for AAEO is $373,480,000, an increase of 13.2 percent above the fiscal year 1984 level of $330,041,000. Significant increases within the disciplines, particularly in astronomical and atmospheric sciences and in studies of the continental crust, will permit the acquisition of needed new equipment and provide advanced scientific computing support. Most of the 19.5 percent increase in the Astronomical Sciences subactivity is intended to carry out the most important recommendations of the report of the Astronomy Survey Committee of the National Academy of Sciences, especially the acquisition of the Very Long Baseline Array (VLBA) radio telescope.

Scientific, technological, and international affairs

The STIA activity carries out essential Foundation responsibilities that cut across scientific and engineering community. The STIA directorate encompasses programs designed to: increase cooperative research efforts between universities and industry and to support small high technology businesses; foster cooperative research and related activities between American and foreign scientists and institutions; support and conduct research on issues pertaining to science and technology policy; maintain an extensive national data base on scientific and technological activities and resources; and support and facilitate activities that crosscut boundaries of discipline-oriented research, including increasing research

opportunities for young investigators, women and minority scientists, and faculty from undergraduate institutions.

The fiscal year 1985 budget request for STIA is $46,900,000, representing an increase of 14.9 percent over the fiscal year 1984 level of $40,822,330. While STIA is the primary NSF activity with responsibility for coordinating research programs that transcend disciplinary and international boundaries, certain research programs targeted at selected groups and institutions have been integrated into the mainstream of NSF activities, in accordance with reorganization plans announced in fiscal year 1984. Funds for such programs are budgeted under the discipline-oriented activities. Of the proposed fiscal year 1985 STIA increase, $5,800,000 is applicable to the NSF Small Business Innovation Research (SBIR) program, to meet the percentage figure required by the Small Business Innovation Development Act of 1982. Increases are slated also for Policy Research and Analysis and Science Resources Studies. A new program Research Opportunities for Women, will be initiated at a funding level of $500,000.

Program development and management

The objective of the PDM activity is to achieve the most effective management of NSF.

The fiscal year 1985 budget request for PDM is $70,902,000, at 6.5 percent increase over the fiscal year 1984 figure of $66,592,350. This will provide for a total of 1,194 full-time equivalent staff, the same level as fiscal year 1984, but at full year funding of salary rates effective January 1984. An increase in funding for planned data processing equipment purchases will enhance the Foundation's data processing capability.

U.S. Antarctic program (USAP)

The USAP supports national efforts to maintain the Antarctic Treaty, ensure that the continent will continue to be used for peaceful purposes only, foster cooperative research to contribute to the solution of regional and worldwide problems, protect the environment, and ensure equitable and wise use of living and nonliving resources. The U.S. scientific research program, administered by the NSF, continues to be the principal expression of national interest and policy in Antarctica.

The fiscal year 1985 budget request for the USAP is $115,080,000. This sum represents an increase of 12.3 percent above the fiscal year 1984 level of $102,456,000. An amount of $6 million is included for the first time to reimburse the Department of Defense (DOD) for military retirement costs. A portion of the increase will provide for more research awards with new initiatives in glaciology and oceanography. In addition, the Operations Support Program expects to offset across-the-board price increases and continue the equipment procurement and facilities upgrading and maintenance which were deferred in prior years.

Science and engineering education

The mission of the SEE activity is to strengthen the quality of the Nation's science and engineering education, and help assure tomorrow's citizens an adequate basis of scientific knowledge for

more productive living in a high-technology, information-intensive society. To this end, the Foundation supports (1) graduate fellowship opportunities designed to recognize and aid the Nation's most talented graduate students and prepare them to enter the science and engineering professions, and (2) precollege science and mathematics education activities to provide young people with high quality training in mathematics, science, and technology.

The fiscal year 1985 budget request for SEE was $75,700,000, to which the Committee added an additional $2 million. Yearly stipends for fellows will increase by 11.1 percent, while the cost-of education allowance to the institution will remain at the fiscal year 1984 level of $4,900. The programs in Precollege Science and Mathematics Education, begun in fiscal year 1984 and including informal science education, enhanced undergraduate education for teachers, and broader in-service teacher activities through local and regional workshops, will continue with the same level of support—$54.7 million—provided in fiscal year 1984.

Special foreign currency

The NSF supports cooperative scientific and engineering projects in India and Pakistan by using U.S.-owned foreign currencies that have been determined to be "in excess" by the Department of the Treasury. The fiscal year 1985 budget request of $2,800,000 is 3.9 percent less than the fiscal year 1984 level of $2,913,680. However, it will allow nearly the same number of U.S. scientists to participate in cooperative research, seminars, and scientific visits with Indian and Pakistani scientists as in the previous year. The requested amount will also provide for planning and evaluation related to the Indo-United States Science and Technology Initiative. Continuing emphasis will be given to cooperative research in: molecular and genetic biology, hydrology, and mineral sciences; seminars and workshops in biosciences, mechanics, and arid land research; and participation in international conferences in biochemistry, solid state sciences, earth sciences, and fluid mechanics.

Committee Views

The Committee has authorized funds totalling $1,528,792,000 for the NSF for fiscal year 1984. This sum represents an increase of $27 million over the level proposed by the administration, of which $25 million is for advanced scientific computing and $2 million is an increase for the science and engineering education (SEE) directorate.

Within the programs of the Foundation, the Committee, in general, agrees with the funding levels and the priorities proposed by the administration. The Committee is particularly pleased to see the increases proposed for overall basic research at the NSF, the continued growth of research instrumentation, including advanced scientific computing, initiatives in engineering research and education, and for certain areas of mathematical and physical sciences, biological sciences, astronomical sciences and the social sciences. The Committee believes that such increases will enable the Foundation to increase significantly its support of high quality research in these areas, many of which are in urgent need of infusion of

new funding for both research and state-of-the-art instrumentation. The Committee notes that the social and behavioral sciences, while faring better than in fiscal year 1984, received only modest increases in comparison to other areas. The Committee reiterates its belief that research in the social and behavioral sciences provides an intrinsic part of the understanding of how society will manage new technologies in the work place and the home.

Our Nation's ability to remain competitive in international and domestic markets, to continue its economic recovery, and to provide the best possible life for all of its citizens, depends upon the strength of its research base. The NSF, which in fiscal year 1983 provided nearly a quarter of the total Federal research support for colleges and universities, plays a vital role in assuring the strength of scientific research in the United States.

The NSF addresses the vitality of the research base by supporting three critical interdependent factors: (1) the quality and availability of advanced instrumentation and equipment for state-of-the-art scientific research; (2) the strength and the quality of the human resource pool from which are drawn both current and future scientists and engineers; and (3) the quality of the educational system that produces this human resource pool.

The Committee believes that, with the additions to the Foundation's budget which the Committee has included in its bill, the proposed program and budget of the NSF addresses each of these critical factors.

The deterioration and obsolescence of research instrumentation in our Nation's universities has been well-documented by reports from the Foundation, the National Academy of Sciences, and others. Acquisition of advanced instrumentation in many scientific fields, particularly chemistry, engineering and astronomy (fields which are highly equipment-intensive), has been deferred for many years.

As a result, researchers are hampered by outmoded instrumentation. Indeed, the lack of state-of-the-art instrumentation serves as a disincentive to young researchers either to enter or remain in academic research. Industrial research laboratories offer significantly better research equipment. For example, a recent study indicates that the median age of university equipment is twice that of equipment in commercial laboratories. The result is a flight of the best scientific and engineering minds to industry, leaving the university setting less able to offer quality teaching for the next generation of scientists and engineers.

The Committee enthusiastically supports the Foundation's initiatives in instrumentation for a variety of scientific disciplines in its budget for fiscal year 1985.

The Foundation's research instrumentation initiatives include support for access to the most advanced computer systems for researchers in all disciplines. In many areas of science and engineering, access to advanced computing resources, as well as literacy in the use of these resources, is critical to progress in answering important scientific questions. Yet much of the research that can be done using supercomputers is not being done, due to lack of access and/or sufficient technical literacy. Some U.S. scientists have chosen to go abroad, in order to gain access to affordable comput-

ing. The results of their research are largely lost to the United States.

Recognizing the critical need for advanced computing capacity, the NSF has appointed an Advisory Committee to assist the NSF in its planning for funding which it receives in this area.

The fiscal year 1985 budget request for advanced scientific computing totals $20 million. The Committee believes, based on testimony at the February 23 hearing by the Chairman of the NSF's Advisory Committee for Advanced Scientific Computing Resources and others, that the level of support proposed by the Foundation is simply inadequate to provide any real improvement in current access.

The Committee therefore has included an additional $25 million for Advanced Scientific Computing. These funds are to be distributed among the various research directorates at the discretion of the Director, after consultation with the National Science Board and the NSF's Advisory Committee for Advanced Scientific Computing Resources. The Foundation is directed to notify the Committee not only of the distribution of these funds among the research directorates, but also among the various supercomputing activities (that is, facilities, networking, and access to facilities and networks).

The Committee urges the NSF to use the additional funds to enhance the planned activities concerning: (1) the establishment of supercomputer facilities; (2) initiation of and access to a national network to link all research scientists and engineers; and (3) support for university research in new supercomputer systems, computer architectures, and numerical analysis related to advanced performance computing.

Across the United States, there is a growing awareness that the next generation of Americans lacks the scientific, mathematical, and technological skills needed to enable it to participate fully in a changing society. Without those skills, individuals cannot hope for a decent life, and our Nation cannot hold its lead against tough international competition. Without a skilled work force, economic recovery can be only marginal and short-lived at best.

While the importance of adequate technological resources cannot be overstated, the most significant factor in our Nation's ability to lead the world in innovation and productivity, is the human factor.

The Committee strongly supports the reestablishment of the Science and Engineering Education Directorate at the NSF, and the funding of SEE.

This year, the NSF budget request in the area of science education focuses on support for graduate research fellowships by increasing the number of fellowships, the annual stipend, and the annual cost of education allowances. The NSF budget also focuses on precollege science and mathematics education.

In the area of graduate research fellowships, the Committee has added an additional $2 million to the Foundation's request. The additional funds are to be used to increase the number of graduate fellowships above the planned number. In precollege science and mathematics education, the Committee supports funding for teacher development and incentives, particularly the continuation of the Presidential Awards for Teaching Excellence in science and mathe-

matics and the Honors Workshops for Precollege Teachers of Science and Mathematics.

The Committee believes that telecommunications technologies, including television, offer an excellent opportunity for cost-effective education in the sciences that reach a large audience, both adult and children. For example, with Foundation support, the public T.V. series "3-2-1 Contact" now reaches over 16 million households weekly. The Committee encourages the Foundation to continue its support of these activities, and to investigate the potential of expanded use of these media to achieve science education objectives.

During 1983, the Committee held a series of hearings nationwide on the role of technology and industrial competitiveness. These hearings focused particularly on a bill introduced by Senator Gorton and other members, to encourage joint university-industry participation in research into advanced manufacturing technologies for all industrial sectors.

Cooperative research relationships between universities and industries antedate large-scale Federal support of academic research. However, in the last few years, the number of these arrangements has grown substantially. The Committee believes that cooperative research between universities and industry provides new and imaginative conduits between basic research and its applications.

There is an important and exciting potential in the involvement of industry with research universities. University-industry cooperation demonstrates that technology transfer is real, and that the number of fields in which university research can be translated relatively quickly into improvements in productivity or product lines is increasing. The benefits to industry and the academic community from the exchange of information includes not only the research, but also the training of the next generation of scientists and engineers.

During the fiscal year 1985 NSF hearings, the Committee examined these issues. The Committee finds that various sectors of the private industry, and the academic community, have not devoted sufficient attention to research in areas critical to U.S. competitiveness, particularly in the area of manufacturing processes. Domestic manufacturers have not sufficiently utilized such recent technological changes in manufacturing as programmable automation, robotics, advanced sensing, and computer-assisted design and manufacturing. A National Academy of Engineering panel recently reported that the United States is beginning to lose its leadership in manufacturing technologies to Japan and West Germany. Our universities, traditionally a major source of technological innovation, devote far less attention to manufacturing now than they did 20 years ago.

Major technological innovations can lead to manufacturing equipment with greatly expanded abilities to "see", "feel" and even "learn", relieving humans of dangerous or monotonous tasks in the process. But to bring about such innovations and to regain our technological advantage in manufacturing, additional research appears to be needed in such areas as:

—visual and tactile sensors;

—machine control strategies and human/machine interfaces; and

—sensor information processing.

The Committee supports the Foundation's proposal to establish multidisciplinary, engineering research centers, as complementary to S. 1286, a bill which the Committee ordered to be reported favorably on March 27, 1984. The NSF Centers, as well as the joint research centers envisioned by S. 1286, would provide for collaboration among students and faculty, and among industry engineers and scientists. The Centers would emphasize the synthesis of engineering knowledge, and seek to integrate different disciplines to bring together the knowledge, methodologies, and tools necessary to solve issues and problems for the engineering community. The Centers would also be critically important as a source of funding and training for all levels of engineering students. The Committee endorses the thoughtful recommendations of the National Academy of Engineering, and believes that the NSF Centers should be located at academic research institutions where they would provide strong links between research and education. The Committee also recommends that the Centers include a focus on the development of advanced manufacturing technologies.

Estimated Costs

In accordance with paragraph 11(a) of rule XXVI of the Standing Rules of the Senate and section 403 of the Congressional Budget Act of 1974, the Committee provides the following cost estimate, prepared by the Congressional Budget Office:

U.S. Congress,
Congressional Budget Office,
Washington, D.C., April 4, 1984.

Hon. Bob Packwood,
Chairman, Committee on Commerce, Science and Transportation, U.S. Senate, Washington, D.C.

Dear Mr. Chairman: The Congressional Budget Office has prepared the attached cost estimate for the National Science Foundation Authorization Act for Fiscal Year 1985.

If you wish further details on this estimate, we will be pleased to provide them.

Sincerely,

Rudolph G. Penner.

Congressional Budget Office Cost Estimate—April 4, 1984

1. Bill number: Not yet assigned.

2. Bill title: National Science Foundation Authorization Act for Fiscal Year 1985

3. Bill status: As ordered reported by the Senate Committee on Commerce, Science and Transportation, March 27, 1984.

4. BILL PURPOSE

The bill authorizes the appropriation of $1,529 million for the National Science Foundation for fiscal year 1985. The amount includes $1,333 million for research and related activities, $115 million for Antarctic research and $78 million for science education.

The amounts authorized are $27 million above the President's request for 1985 and $207 above the 1984 appropriation. The bill also repeals certain laws concerning the NSF.

5. Estimated cost to the Federal Government:

[By fiscal years, in millions of dollars]

	1985	1986	1987	1988	1989
Authorization Level	1,529				
Estimated Outlays	777	514	151	87	

The costs of this bill fall within budget function 250.

Basis of estimate: The estimate assumes that all funds authorized will be appropriated prior to the beginning of the fiscal year. The estimate of outlays is based on the programs historical spending patterns.

6. Estimated cost to State and local governments: None.

7. Estimate comparison: None.

8. Previous CBO estimate: On March 26, 1984, the CBO prepared a cost estimate on H.R. 4974, the National Science Foundation Act, fiscal year 1985, as ordered reported by the House Committee on Science and Technology. H.R. 4974 authorized $1,560 million for the NSF, $31 million more than authorized in the Senate bill.

9. Estimate prepared by Jeff Nitta.

10. Estimate approved by James L. Blum, Assistant Director for Budget Analysis.

Regulatory Impact Statement

In accordance with paragraph 11(b) of rule XXVI of the Standing Rules of the Senate, the Committee provides the following evaluation of the regulatory impact of the legislation:

The bill provides authorization of appropriations to the NSF for fiscal year 1985 and extends for 1 year existing programs supported by NSF. As a practical matter, no new regulations will be promulgated by any program as a result of any direct mandate contained in this legislation.

Section-by-Section Analysis

SECTION 1

Cites the title as the National Science Foundation Authorization Act for fiscal year 1985.

SECTION 2

Authorizes appropriations of $1,525,992,000 for fiscal year 1985 for the programs of the NSF, in the following categories:

(1) Mathematical and Physical Sciences, $416,710,000;

(2) Engineering, $147,100,000;

(3) Biological, Behavioral, and Social Sciences, $253,120,000;

(4) Astronomical, Atmospheric, Earth and Ocean Sciences, $373,480,000;

(5) United States Antarctic Program, $115,080,000;

(6) Scientific, Technological, and International Affairs, $46,900,000;
(7) Program Development and Management, $70,902,000;
(8) Science and Engineering Education, $77,700,000; and
(9) Advanced Scientific Computing, $25 million.

SECTION 3

Stipulates periods under which appropriations will remain available for obligation.

SECTION 4

Limits amounts for consultation, representation, or extraordinary expenses to $3,500.

SECTION 5

Authorizes appropriations of $2,800,000 for expenses incurred outside the United States to be paid in foreign currency.

SECTION 6

Limits transfer of funds between programmatic categories to less than 10 percent of the total for that category except through written notification and approval of such transfers by the appropriate Congressional committees, including the Senate Commerce Committee.

SECTION 7

Makes several technical amendments to the National Science Foundation Act of 1950.

CHANGES IN EXISTING LAW

In compliance with paragraph 12 of rule XXVI of the Standing Rules of the Senate, changes in existing law made by the bill, as reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new material is printed in italic, existing law in which no change is proposed is shown in roman):

THE NATIONAL SCIENCE FOUNDATION ACT OF 1950

SECTION 4 OF THAT ACT

SEC. 4. (a)–(d) * * *

(e) The Board shall meet annually on the third Monday in May unless, prior to May 10 in any year, the Chairman has set the annual meeting for a day in May other than the third Monday, and at such other times as the Chairman may determine, but he shall also call a meeting whenever one-third of the members so request in writing. A majority of the members of the Board shall constitute a quorum. Each member shall be given notice, [by registered mail or certified mail mailed to his last known address of record] not less than fifteen days prior to any meeting, of the call of such meeting.

(f)–(j) * * *

SECTION 5 OF THAT ACT

SEC. 5. (a)–(d) * * *

(e) The Director shall not make any contract, grant, or other arrangement pursuant to section 11(c) without the prior approval of the Board, except that a grant, contract, or other arrangement involving a total commitment of less than [$2,000,000, or less than $500,000] *$6 million, or less than $1,500,000* in any one year, or a commitment of such lesser amount or amounts and subject to such other conditions as the Board in its discretion may from time to time determine to be appropriate and publish in the Federal Register, may be made if such action is taken pursuant to the terms and conditions set forth by the Board, and if each such action is reported to the Board at the Board meeting next following such action.

(f) * * *

SECTION 9 OF THAT ACT

[SPECIAL COMMISSIONS

[SEC. 9. (a) Each special commission established pursuant to section 4(i) shall consist of eleven members appointed by the Board, six of whom shall be eminent scientists and five of whom shall be persons other than scientists. Each special commission shall choose its own chairman and vice chairman.

[(b) It shall be the duty of each such special commission to make a comprehensive survey of research, both public and private, being carried on in its field, and to formulate and recommend to the Foundation at the earliest practicable date an over-all research program in its field.]

SPECIAL COMMISSIONS

SEC. 9. (a) Each special commission established under section 4(h) shall be appointed by the Board and shall consist of such members as the Board considers appropriate.

(b) Special commissions may be established to study and make recommendations to the Foundation on issues relating to research and education in science and engineering.

SECTION 12 OF THAT ACT

PATENT RIGHTS

SEC. 12. [(a)] Each contract or other arrangement executed pursuant to this Act which relates to scientific research shall contain provisions governing the disposition of inventions produced thereunder in a manner calculated to protect the public interest and the equities of the individual or organization with which the contract or other arrangement is executed: *Provided, however,* That nothing in this Act shall be construed to authorize the Foundation to enter into any contractual or other arrangement inconsistent with any provision of law affecting the issuance or use of patents.

[(b) No officer or employee of the Foundation shall acquire, retain, or transfer any rights, under the patent laws of the United States or otherwise, in any invention which he may make or

produce in connection with performing his assigned activities and which is directly related to the subject matter thereof: *Provided, however,* That this subsection shall not be construed to prevent any officer or employee of the Foundation from executing any application for patent on any such invention for the purpose of assigning the same to the Government or its nominee in accordance with such rules and regulations as the Director may establish.]

SECTION 14 OF THAT ACT

MISCELLANEOUS PROVISIONS

SEC. 14(a) * * *

[(b) OUTSIDE EMPLOYMENT AND ACTIVITIES.—Neither the Director, the Deputy Director, nor any Assistant Director shall engage in any other business, vocation, or employment while serving in such position; nor shall the Director, the Deputy Director, or any Assistant Director, except with the approval of the Board, hold any office in, or act in any capacity for, any organization, agency, or institution with which the Foundation makes any grant, contract, or other arrangement under this Act.]

(c)–(i) * * *

THE NATIONAL SCIENCE FOUNDATION AUTHORIZATION ACT, FISCAL YEAR 1978

SECTION 6 OF THAT ACT

[SEC. 6. (a) The National Science Foundation shall establish a Resource Center for Science and Engineering to be located at an educational institution which—

[(1) enrolls substantial numbers of minority students, students from low-income families, or both;

[(2) is geographically located near one or more population centers of low-income families or minority groups;

[(3) demonstrates a commitment to encouraging and assisting minority students or students from low-income families, or both; and

[(4) has an existing or developing capacity to offer doctoral programs in science and engineering.

[(b) The Center established under this section shall—

[(1) support basic research and the acquisition of necessary research facilities and equipment;

[(2) serve as a regional resource in science and engineering for the community which the Center serves; and

[(3) develop joint educational programs with nearby pre-college and undergraduate institutions which enroll a substantial number of minority students or students from low-income families.]

SECTION 10 OF THAT ACT

[SEC. 10. (a)(1) Each officer or employee of the National Science Foundation who performs a decisionmaking function in the handling of any application or proposal for a grant from or contract with the Foundation shall provide a written statement for the

record identifying (in accordance with the standards promulgated under subsection (b)) any financial interest or other relevant interest he or she has in the person submitting the application or proposal and any academic affiliation he or she has with that person. If the application or proposal results in an award, the statement shall be made available to the public.

[(2) The Director shall remove or take other appropriate disciplinary action against any employee who knowingly violates the requirements of this subsection.

[(b)(1) Within 60 days after the date of the enactment of this Act, the Director of the National Science Foundation shall publish—

[(A) proposed standards to implement the requirements of subsection (a), designed to minimize conflicts of interest and to assure that the appropriate files of the Foundation relating to any grant or contract referred to in such subsection contain a statement of any financial or other relevant interest which any of the officers and employees involved may have in the person or institution applying for or proposing the grant or contract as well as any academic affiliation which any of such officers and employees may have with such person or institution; and

[(B) proposed standards appropriately requiring identification of any conflicts of interest by peer reviewers.

[(2) Within 120 days after the date of the enactment of this Act, the Director shall promulate the standards published under paragraph (1), with such modifications as the Director may deem appropriate; and such standards shall take effect upon their promulgation.]

(c) (Repealed.)

[(d) If the President issues an Executive order that requires financial disclosure by officers and employees of Federal agencies generally, only so much of this section as relates to peer reviewers and to academic affiliations of officers and employees shall remain effective.]

○